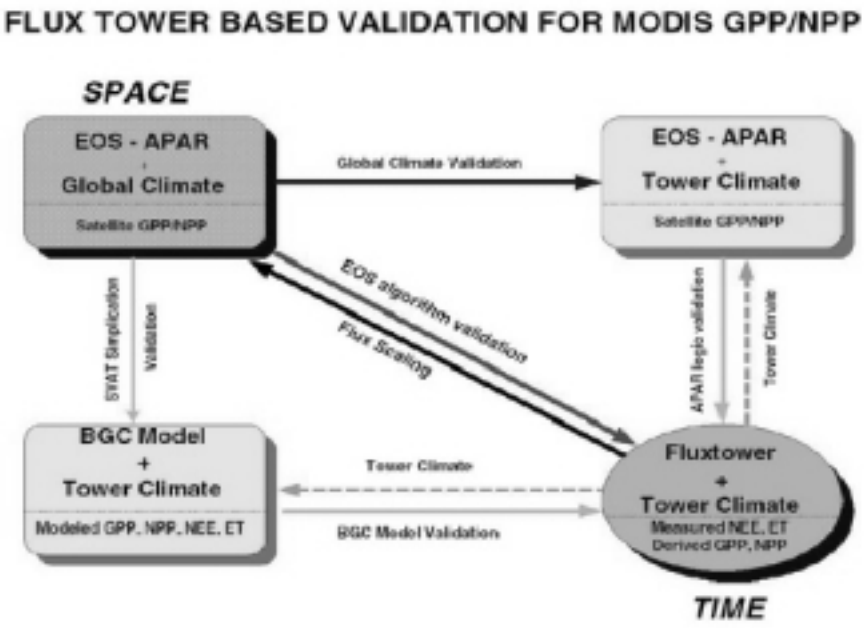
Model Validation Using AmeriFlux Data

One of the ongoing justifications for the AmeriFlux network is the opportunity to use the measurements for validation of both satellite data and model simulations. Commencing January 2000 the Carbon Dioxide Information Analysis Center (CDIAC) will begin posting weekly micrometeorological data from participating AmeriFlux sites for a model validation exercise initiated by Dr. Steve Running.

During this exercise participating AmeriFlux sites will provide canopy-top, micrometeorological data **every** week for use in the BIOME-BGC model. In return, daily evapotranspiration, NEE, and NPP model output and weekly MODIS-derived NPP values will be posted weekly for review and analysis by AmeriFlux scientists. **Other modeling teams are welcome to participate but must be willing to provide similar weekly computations for use by AmeriFlux groups.**

The following diagram offers an overview of the AmeriFlux measurements/EOS MODIS & BIOME-BGC validation exercise. Below are details on the data submission requirements for AmeriFlux groups, site and vegetation characterizations needed to initialize the BIOME-BGC, posting and viewing results, and contact information.



Data Submission Requirements for AmeriFlux Groups: Each AmeriFlux team must provide daily micrometeorology data every week to CDIAC as an ASCII, comma-separated data file. These daily measurements should be from the top of the canopy location based on hourly or half-hourly reporting intervals. Specifically, each AmeriFlux team should submit data files with the following format and content.

YEAR,JULIAN DAY,Tmax,Tmin,Tday,PRECIP,SOLRAD,VPD,WS

where

YEAR is a four-digit year (e.g., 2000).

JULIAN DAY is a one to three-digit Julian day (e.g., 281).

Tmax is the daily maximum air temperature (°C).

Tmin is the daily minimum air temperature (°C).

Tday is the daily average daylight air temperature (°C). This should be computed from hourly or half-hourly temperatures when solar radiation exceeds 50 W/m^2.

PRECIP is the 24 hour total precipitation (cm).

SOLRAD is the daily average incident PAR or shortwave radiation (W/m^2).

VPD is the daily average daylight VPD (pascals). Again this should be computed when solar radiation exceeds 50 W/m^2.

WS is the daily average wind speed (m/s).

AmeriFlux investigators may submit data directly to CDIAC by using the File Transfer Protocol (FTP) or by using e-mail. The easiest way to submit data is to allow CDIAC to "mirror" an area on your local server. For this mirroring option to work smoothly it is critical that participants post their weekly micrometeorological data to the same server location and subdirectory each week.

Site and Vegetation Characterizations Needed To Initialize the BIOME-BGC: To initialize the BIOME-BGC model, the Montana team must know the biome type and something about the vegetation at each AmeriFlux site including

*Site Parameters (minimally latitude, longitude and elevation)
*Stand Parameters (minimally age of stand, species composition and canopy height)
*Leaf Area Index
*Leaf Longevity
*Specific Leaf Area
*Soil Water Holding Capacity in top 1 m
*Leaf Carbon Content
*Leaf Stem Carbon Content
*Leaf Litter Carbon Content
*Leaf Soil Carbon Content
*Leaf Nitrogen Content
*Leaf Stem Nitrogen Content
*Leaf Litter Nitrogen Content
*Leaf Soil Nitrogen Content

Posting and Viewing Results: Model calculations will be posted back on the CDIAC AmeriFlux WWW site in an ongoing graph for each participating AmeriFlux tower site within 24 hours. An important feature of this exercise is the fact the Montana modeling group will post the NEE, NPP, and GPP calculations without benefit of the AmeriFlux flux data. More details on posting results will be furnished once CDIAC knows the number of participating AmeriFlux sites and modeling teams.

Contacts:

For more information about the validation exercise, please contact ...

Steve Running
School of Forestry
Numerical Terradynamic Simulation Group (NTSG)
University of Montana
Missoula, MT 59812-1063
E-mail: swr@ntsg.umt.edu
Phone: 406-243-6311
Fax: 406-243-4510
WWW: http://www.forestry.umt.edu/ntsg

To join the validation exercise or for data submission/posting information, please contact ...

Tom Boden
Carbon Dioxide Information Analysis Center
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831-6335
E-mail: tab@ornl.gov
Phone: 865-241-4842
Fax: 865-574-2232
WWW: http://cdiac.esd.ornl.gov/programs/ameriflux

Back to the AmeriFlux Home Page